IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No. 6523
Michael G. Luby	Examiner: Alina A. Boutah
Application No.: 09/587,542	Technology Center/Art Unit: 2143
Filed: June 1, 2000	APPELLANTS' BRIEF UNDER 37 CFR §41.37
For: DYNAMIC LAYER CONGESTION CONTROL FOR MULTICAST TRANSPORT	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to the Notice of Appeal mailed on September 22, 2006 for the above-referenced application, Appellants submit this Brief on Appeal.

TABLE OF CONTENTS

1. REAL PARTY IN INTEREST

The real party in interest in this appeal is Digital Fountain, Inc., the assignee of record for the present application.

2. RELATED APPEALS AND INTERFERENCES

None.

3. STATUS OF CLAIMS

Claims 1-12 are currently pending in the application. All claims stand rejected pursuant to a Final Office Action mailed May 22, 2006 (hereinafter "the Final Office Action") under 35 USC §103(a). The rejections of each of claims 1-12 are believed to be improper and are the subject of this appeal. A copy of the claims as rejected is attached as an Appendix.

4. STATUS OF AMENDMENTS

In response to the Final Office Action and an Examiner Interview on August 15, 2006, claims 1, 3 and 8 were amended. Those amendments have not been entered, according to a Supplemental Advisory Action send by facsimile on October 3, 2006.

5. SUMMARY OF CLAIMED SUBJECT MATTER

In the following summary, Appellant has provided exemplary references to sections of the specification and drawings supporting the subject matter defined in the claims as required by 37 CFR §41.37. The specification and drawings also include additional support for other exemplary embodiments encompassed by the claimed subject matter. Thus, these references are intended to be illustrative in nature only.

Claims 1-2 and 10-12 are apparatus claims and claims 3-9 are method claims. Claims 1, 3 and 8 are independent claims.

The claims generally relate to packet multicasting on a network. With multicasting, a sender sends a packet addressed not to a single, specified destination on the network, but to a multicast address that could refer to a group of destinations on the network. Destinations can join and leave a multicast group. In many networks, decisions as to how and

where to propagate a particular multicast packet may depend on which destinations are in the multicast group. For example, if part of the network has paths that look like branches of a tree and none of the destination nodes in a particular branch are members of a particular multicast group, the network will not propagate that group's multicast packets down that particular branch. As a result, leave messages can reduce the overall network traffic as packets are no longer propagated into sections of the network where there are no group members interested in receiving the multicast group's packets.

Destinations join a group by sending join messages and leave a group by sending leave messages. In some cases, leave messages get lost or are delayed in their travels over the network. Thus, if there is only one remaining multicast group member in a branch of the network and that one member sends a leave message that gets lost or delayed, the network would be expected to continue to propagate that group's packets through that branch of the network even though there is no interest in those packets within that branch. As a result, network capacity is wasted.

With embodiments of the invention described in the specification, there is a plurality of layers sending a group's multicast packets. The sender of multicast packets sends packets over each layer according to the layer's sending rate and the sending rates decline over time. As a result, a destination that wanted to maintain a steady reception rate for multicast packets would have to join additional layers (i.e., send join messages) to keep up, otherwise, the overall reception rate to that destination would decline. One desirable effect of declining sending rates is that the overall reception rate of an uninterested destination would decline even if a leave message from that destination was lost or delayed.

To consider the differences between a conventional multicast messaging approach and the approaches described in the present application, consider a network wherein a particular sender sends multicast packets for a multicast group and there is a section of the network having one destination node interested in those packets. Prior to joining the group, the destination node does not receive any of the group's packets (however, depending on the network configuration, those packets might pass by the destination node on their way to somewhere else). Once the

destination node sends a join message and that join message is received, that destination node receives the group's packets and does not need to do anything to continue to receive the group's packets. When the destination node is no longer interested in the group, it sends a leave message and when that message is received by an access device, the destination node no longer receives that group's packets (again, unless the packets are passing by in their way to somewhere else).

In the embodiments described in the specification, quite a different approach is taken. A destination node can begin to receive packets by sending a join message to join one or more layers, but because the sending rates of the joined layers are reduced over time, the destination node needs to send additional join messages to join other layers if it wants to keep up its reception rate. The destination node can send a leave message to drop the sending rate to zero, but even if that message is lost or delayed, the absence of join messages will result in a reduction of the reception rate. As a result, network usage for unwanted multicast packets goes down even if leave messages are lost or delayed.

Independent Claim 1

Independent claim 1 recites an apparatus supporting packet multicasting, including a plurality of layers, wherein a layer is a logical channel that carries packets for the multicast group, logic for accepting join and leave messages and logic for reducing the sending rate of at least one of the plurality of layers over time independent of receiver feedback, among other elements.

Independent Claim 3

Independent claim 3 recites a method including accepting multicast join and leave messages at an access device, transmitting multicast packets to a plurality of layers, and reducing the sending rates for each of the layers over time independent of receiver feedback, thereby reducing a reception rate of a host that is joined to a fixed set of layers, among other elements.

Independent Claim 8

Independent claim 8 recites a method including transmitting multicast packets to a plurality of dynamic layers at a rate approximately equal to an aggregate sending rate, reducing a sending rate for a first one of the plurality of dynamic layers over time independent of receiver

feedback and concurrently with the step of reducing, increasing a sending rate of at least one other of the plurality of dynamic layers, thereby maintaining the aggregate sending rate for the plurality of dynamic layers, among other elements.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1-12 are unpatentable under 35 USC §103(a) over Vicisano et al., "TCP-like Congestion Control for Layered Multicast Data Transfer" (hereinafter "Vicisano") in view of U.S. Patent No. 6,505,253 issued to Chiu et al. (hereinafter "Chiu").

7. ARGUMENT

For a rejection to be maintained under 35 U.S.C. §103(a), the Examiner is charged with factually supporting a *prima facie* case of obviousness. MPEP 2142. Such a *prima facie* case requires, *inter alia,* that all limitations of the claims be taught or suggested by the cited references, that there is a suggestion or motivation to combine reference teachings, and a reasonable expectation of success found in the prior art. See, In re Vaeck, 20 USPQ2d 1438 (Fed Cir 1991). In this instance, not all the limitations of the claims are taught or even suggested by the combination of Vicisano and Chiu.

Vicisano discloses multicasting using a number of layers, where each layer has a different bandwidth (i.e., sending rate) (p. 997). Receivers can adjust their reception rate according to network conditions by joining or leaving layers (p. 998), which implies that the receiving rate may change. However, the receiving rate does not change over time for a given layer. Instead, all that Vicisano suggests is that, over time, a receiver can join and leave layers to reduce (or increase) the receiver's reception rate, in response to loss rates or for any other reason. There is no suggestion that the sending rate of a given layer is reduced over time, as is claimed in claim 1.

Claim 3 recites a step of "reducing the sending rates for each of the layers over time." As explained above, since Vicisano fails to disclose or suggest reducing a sending rate for a layer over time, it necessarily also fails to disclose or suggest reducing the sending rates for each of the layers over time.

Claim 8 includes steps of "reducing a sending rate for a first one of the plurality of dynamic layers over time" and "concurrently with the step of reducing, increasing a sending rate of at least one other of the plurality of dynamic layers." As explained above, Vicisano does not teach or suggest changing the sending rate of any layer over time, much less the changing of the sending rate of any layer.

Apparently, the Examiner concedes that Vicisano does not teach the claimed reducing of sending rates of layers over time, but asserts that Chiu teaches that. Chiu was cited as teaching reducing a sending rate over time as claimed. Chiu in fact shows adjusting for a network rate based on congestion feedback. Notably, the portions of Chiu cited by the Examiner show this. See, for example, col. 9, lines 47-48 ("Upon receipt of an ACK message indicating that packets have been lost"), col. 12, lines 54-55 ("After receipt of a congestion report, the sender reduces its data transmission rate"), col. 22, lines 27-28 (" In reaction to a congestion message"), and col. 24, lines 59-62 ("As a result of receiving congestion feedback information from one or more receivers, the sender attempts to reduce the rate of transmission to accommodate the slow receivers"). Thus, it is clear that the system of Chiu does not reduce "the sending rate...over time," but keeps its sending rate constant over time until it receives an indication of congestion, i.e., receiver feedback.

As claimed in each of the independent claims, a sending rate is reduced independent of receiver feedback, which is clearly not taught or suggested by Chiu (or Vicisano). As explained in the specification as originally filed, there are disadvantages to having a system wherein a sender reduces a sending rate only after receiving a leave message from a receiver, as explained above.

The present application has undergone a number of amendments and Requests for Continued Examination and an Examiner Interview in an attempt to resolve these issues, but no agreement was reached. Appellant's position is that neither of the references teach or suggest that claimed element and that the Examiner is improperly ignoring claim language in order to reject the claims.

Claims 1-12 stand rejected under 35 USC §103(a) as being unpatentable over Vicisano and Chiu. Appellant respectfully notes that the rejection of independent claims 1, 3 and 8 and their corresponding dependent claims is improper for failure to establish a prima facie case of obviousness under 35 USC §103(a).

8. CONCLUSION

Appellant believes that the above remarks are fully responsive to all grounds of rejection set forth in the outstanding Final Office Action and provide adequate grounds for reversal on appeal. Please deduct the requisite fees pursuant to 37 CFR §1.17(c) from Deposit Account 20-1430 and any additional fees that may be due in association with the filing of this Appeal Brief.

Respectfully submitted,

Date: 22 Nov, 2006

Philip H. Albert
Reg. No. 35,819

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 650-326-2400 Fax: 650-326-2422
60877387 v1

9. CLAIMS APPENDIX

1. (currently amended) In a network supporting packet multicasting from a sender into the network, where hosts join and leave a multicast group by sending join and leave messages, respectively, to an access device in the network, an improvement comprising:

a plurality of layers, wherein a layer is a logical channel that carries packets for the multicast group;

logic for distributing multicast traffic from the sender over the plurality of layers according to a sending rate associated with each of the plurality of layers;

logic for accepting join and leave messages at the access device from the hosts, wherein the join and leave messages are associated with one or more layers of the plurality of layers; and

logic for monotonically reducing the sending rate of at least one of the plurality of layers over time independent of receiver feedback.

2. (original) The network of claim 1 further comprising logic for raising the sending rate of an unused layer.

3. (currently amended) In a network supporting packet multicasting from a sender into the network, where hosts join and leave a multicast group by sending join and leave messages, respectively, to an access device in the network, a method comprising the steps of:

accepting multicast join messages at the access device, wherein a join message indicates that a host beyond an interface to the access device requests membership in a layer, where a layer is a logical channel over which packets are multicast to hosts that are members of a multicast group for the layer;

transmitting multicast packets to a plurality of layers, wherein multicast packets are transmitted by the sender on a given layer at a rate approximately equal to a sending rate associated with the layer;

accepting multicast leave messages at an access device from hosts, wherein a leave message indicates that a host requests removal from a layer indicated in the leave message; and

reducing the sending rates <u>monotonically</u> for each of the layers over time independent of receiver feedback, thereby reducing a reception rate of a host that is joined to a fixed set of layers.

4. (previously presented) The method of claim 3, further comprising a step of offsetting a reduced reception rate at a host due to a reduced sending rate for each of the layers by the host joining one or more additional layers, if a reception rate at the host is to be maintained.

5. (previously presented) The method of claim 3, wherein the step of reducing the sending rates includes reducing the sending rate for a selected one of the layers to zero.

6. (previously presented) The method of claim 5, further comprising a step of increasing the sending rate for the selected one of the layers after an idle period has elapsed.

7. (previously presented) The method of claim 6, wherein the idle period is longer than a leave latency associated with the access device responding to a leave message.

8. (currently amended) In a network supporting packet multicasting from a sender into the network, wherein hosts join and leave a multicast layer by sending join and leave messages, respectively, to an access device in the network, a method comprising the steps of:

transmitting multicast packets to a plurality of dynamic layers at a rate approximately equal to an aggregate sending rate;

reducing a sending rate <u>monotonically</u> for a first one of the plurality of dynamic layers over time independent of receiver feedback; and

concurrently with the step of reducing <u>the sending rate monotonically</u>, increasing a sending rate of at least one other of the plurality of dynamic layers, thereby maintaining the aggregate sending rate for the plurality of dynamic layers.

9. (previously presented) The method of claim 8, wherein a host connected to the network is able to maintain a reception rate over time by joining the at least one other dynamic layer.

10. (previously presented) The improvement of claim 1, wherein the logic for accepting join and leave messages receives join messages from hosts attempting to maintain a reception rate at the host whereby the host joins one or more additional layers to maintain the reception rate and offset reduced reception rates at a host due to a reduced sending rate for each of the layers.

11. (previously presented) The improvement of claim 1, wherein the logic for reducing the sending rate operates to reduce the sending rate of at least one of the plurality of layers independent of congestion.

12. (previously presented) The improvement of claim 1, wherein the logic for accepting join and leave messages receives join messages from hosts attempting to maintain a reception rate at the host whereby the host joins one or more additional layers to maintain the reception rate and offset reduced reception rates at a host due to a reduced sending rate for each of the layers and wherein the logic for reducing the sending rate operates to reduce the sending rate of at least one of the plurality of layers independent of congestion.

10. EVIDENCE APPENDIX

None.

11. RELATED PROCEEDINGS APPENDIX

None.